

WHITE PAPER

BOXES DELIVER ON PROTECTION, BRANDING, & SUSTAINABILITY FRONTS FOR E-COMMERCE



FIBRE BOX ASSOCIATION®



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With the rapid growth of e-commerce and customer expectations, it seems everyone involved with order fulfillment is looking for low-cost solutions to help them reliably meet delivery requirements. Technologies like picking robots, drones, real-time locating systems, and Internet of Things (IoT) connectivity are all being examined as a means of dealing with e-commerce pressures.

With U.S. e-commerce growth at over 15 percent last year,¹ and distribution center (DC) operators challenged by pressure to hold down costs,² it's understandable that companies should evaluate any solution that can help. However, the level of fascination with some of these new technologies may cause people in industry to overlook a technology that plays a leading role in supporting today's requirements: the corrugated box.

Yes, the corrugated box can and should be thought of as one of the key technologies for e-commerce-era fulfillment.

Just think about corrugated material for a minute. Corrugated boxes are vital to order fulfillment and customer satisfaction, but there's also great technology in the humble box. A corrugated box gains much of its strength from its fluted inner layer or "medium," which is reinforced with linerboard on the outer surfaces. These flutes are based on the arch, one of history's most successful engineering designs.

Through the inherent strength of this arch-like fluting, and linerboard's qualities as a surface for printing or coatings, corrugated gains many of its desirable characteristics.

Corrugated capabilities also are evolving, through technology including new coatings and on-demand printing that allows boxes to better serve needs such as enhanced temperature control and customized branding. In fact, the corrugated box is at the center of trends like frustration-free packaging, enhanced branding as part of the "unboxing" experience, and critical issues like efficient packing, cube/space utilization, and protection of shipments.

The multiple advantages of corrugated packaging are explained in this white paper. According to the Fibre Box Association (FBA), a non-profit trade association that represents North American corrugated packaging manufacturers and approximately 95 percent of U.S. industry shipments, corrugated plays an integral role in meeting today's distribution challenges. Corrugated has evolved to deliver new capabilities both for e-commerce and for traditional channels.

This paper will highlight several ways that corrugated provides value while helping meet distribution and customer service objectives, including:

- Flexibility to "right size" packaging for cost efficient shipping.
- Protection and insulation of goods in transit.
- A heightened level of branding and customer experience via custom printing, logos, easier unboxing.
- Sustainability benefits.

¹ U.S. Census Bureau news release, "Quarterly Retail E-Commerce Sales, 4th Quarter 2016." <https://www2.census.gov/retail/releases/historical/ecommm/16q4.pdf>
² MHI 2017 Annual Industry Report, Figure 4, Top Company Challenges. <https://www.mhi.org/publications/report>



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"There are so many reasons why corrugated boxes are the preferred container for delivering goods to consumers and customers," states Rachel Kenyon, vice president of FBA. "There is the durability of the packaging and performance with aspects like cushioning, protecting, and insulating the goods being shipped. It's a natural, sustainable material. And, importantly for today, there is a great opportunity on the outside of the box for branding and providing added information about the product. Corrugated is really an unsung hero for what it can do to meet distribution requirements and create better customer experiences."

Versatile & evolving

Corrugated boxes have a long history of meeting distribution needs, adapting to requirements along the way. Order online from one of the major e-commerce providers, and it's likely your shipment will arrive in a corrugated box, complete with printed logos or special colors.

The ease and reliability of e-commerce have given rise to new niches, like gourmet meal kits and shaving kit subscriptions. Higher-end corrugated boxes are often used as the shipping containers for these new markets. Companies also work closely with corrugated box suppliers to create boxes that make e-commerce shipping as space- and cost-efficient as possible, protect the goods from damage, simplify the process of unpacking for the consumer, and utilize graphics on inner and outer surfaces to enhance the brand.

While e-commerce has changed the types and variety of corrugated boxes used by shippers, the statistics show it has not led to massive growth in consumption. According to FBA, corrugated production peaked in 1999,³ with 1-percent to 2-percent growth in recent years, but well below the 12-percent to 15-percent rate of growth for e-commerce.

³ *Boston Globe* article from Aug. 12, 2017, "Why Ecommerce Might Not Save the Cardboard Box." <https://www.bostonglobe.com/business/2017/08/11/why-online-shopping-may-not-save-cardboard-box/s2euhXKXpRhDWoOzmu2CNO/story.html>



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This “right-sizing” of boxes for e-commerce takes some data management skills from shippers. They need to know the dimensions and weights of their products, and common order patterns.

There are multiple reasons why corrugated use hasn't surged at the same rate as e-commerce. For one thing, slower growth in traditional retail lessens the need for packaging goods for brick & mortar channels. At the same time, manufacturers have found ways to downsize

products (e.g., concentrated liquid detergents) to reduce the volume and/or weight of goods, thus reducing the packaging needed.

However, e-commerce shippers are turning to corrugated because of its versatility and other desirable characteristics like its ability to protect products.

According to research firm Freedonia, demand for boxes for

e-commerce packaging will grow more than 10 percent per year through 2020, with 95 percent of box demand to be met by corrugated.⁴

Corrugated is inherently versatile, in that it is the only rigid packaging medium that can be cut and folded into an infinite variety of shapes and sizes while offering thousands of possible combinations of board types, flute sizes, weights, adhesives, treatments and coatings.

With the rise of e-commerce, there has been a focus on lighter-weight designs, as well as boxes that serve as both the primary package and the shipping container. There is also collaboration between e-commerce shippers and box manufacturers to design box sizes that match up with consumer ordering patterns so that there is minimal empty or “void” space, while making the boxes easy to open.

This “right-sizing” of boxes for e-commerce takes some data management skills from shippers. They need to know the dimensions and weights of their products, and common order patterns. With this knowledge, they can

work with corrugated suppliers to make boxes with minimal void space, thus lowering shipping costs. Shippers also collaborate with corrugated box manufacturers to design inter-pack features that protect shipments from shifting or damage in transit. Yet another alternative is machinery that custom produces the right size box “on demand” from corrugated consumables.

Another major evolution in corrugated boxes is what can be printed on the outside of a box. While linerboard has always been an excellent surface for printing, over the last several years, advances in production-speed digital printing equipment for corrugated have opened new opportunities for customizing the information printed on boxes.

While digital printing for corrugated has been around since the early 2000s, it wasn't until 2013 that the equipment became much better suited to production-speed work instead of just limited short runs or samples. With the advances in digital printing, e-commerce shippers and consumer goods companies can extend the look of their brand to the shipping container, while for the retail channel, digital printing on corrugated supports attractive “shelf-ready” packaging and end-of-aisle displays.

Protecting the goods

Many of corrugated's advantages stem from its ability to cushion and protect goods at a relatively low container weight. The key to this high strength-to-weight ratio is the arch-based fluted layer. The flutes and linerboard also naturally insulate the product from temperature variations, while the linerboard provides additional strength and a great surface for printing. Corrugated box suppliers also offer double-wall and triple-wall designs to hold and protect heavier goods.

⁴ Freedonia Group press release, Dec. 19, 2016, “Market for Boxes Used in E-commerce to Grow 10% Annually Through 2020.” <https://www.freedoniagroup.com/Content/News/2016/12/19/Market-for-Boxes-Used-in-ECommerce-to-Grow-10-Annually-Through-2020>



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In combination with inner-pack separators, a corrugated shipping box provides excellent cushioning qualities. The better the cushioning provided by the container or box, the less chance there is of damage to products during the delivery process, which in turn helps reduce costly returns. Studies indicate the expense of returns processing ranges from 20 percent to 65 percent of the cost of goods sold.⁴ so steps to reduce damage via better packaging should help reduce returns costs.

“Corrugated doesn’t weigh very much, and there is a tremendous amount of strength to it,” notes Kenyon. “The other factor is that it cushions and absorbs. These are some of the qualities the industry tests for and maintains specifications around.”

Corrugated manufacturers also are innovating with new types of coatings to enhance the cooling properties of boxes. While the fluted medium of a box and its linerboards naturally insulate, shippers with perishable goods will

find that corrugated boxes are further improving when it comes to their ability to protect perishable goods.

Additionally, corrugated manufacturers have devised alternatives to wax-coated corrugated boxes that were once a staple for distributing food products that required a moisture barrier, but weren’t easy to recycle in the normal paper-recycling stream. There are now more the 50 recyclable coatings that replace wax for such applications, which has led to a reduction in the use of waxed boxes, and increased corrugated recycling thanks to these wax alternatives.

“Corrugated boxes are proven and reliable, but the industry continues to innovate,” explains Dennis Colley, president & CEO of FBA. “Through new designs and coating technology, corrugated is becoming even better at protecting products, while remaining lightweight and right-sized to minimize logistics costs—and easy to open for consumers.”



The “unboxing” experience

Companies known for their technology innovation, such as Apple and Amazon, have another thing in common: their innovative use of corrugated boxes for branding and customer experience purposes.

“A tremendous amount of corrugated is recovered—people have been getting the message, but because of buying behaviors shifting to more goods going directly to consumers’ homes, we want to make sure the recovery rate continues to improve.”

—Rachel Kenyon, vice president of FBA

Apple, for instance, has been a leader in using high quality boxes and graphics for its technology products. Amazon uses brown corrugated boxes in shipping, but has made its smile logo and branded sealing tape a familiar and reliable part of its customer experience. Additionally, Amazon’s “Frustration Free” packaging initiative focuses on streamlining the unboxing process by working with product manufacturers to design a primary package that also doubles as the shipping carton.

With digital printing allowing for vibrant colors, logos, and product information to be quickly and beautifully produced on corrugated, the humble box is now shaping up as a platform for an enhanced customer experience. “Companies are finding that corrugated is a great way to extend their brand as part of the unboxing experience,” says Kenyon. “And, by doing things like allowing the shipping containers to double as a product box that minimizes the need for extra materials, the experience is improved for the customer because it eliminates the frustration that can happen with opening some e-commerce shipments.”

Another way corrugated boxes can help improve customer service is through enhanced product traceability. Using bar code or radio frequency identification (RFID) technology, a box can serve as a platform to track product location in the supply chain, providing crucial information such as how long perishable items were in transit. Using Cloud network traceability solutions in conjunction with UPC or QR codes on boxes, enhanced chain of custody information can be achieved at lower cost than was possible in the past.

Strong on sustainability

Any shipper using corrugated boxes can be assured that the material itself has a positive sustainability story to tell. Corrugated has an excellent recycling rate.

In 1993, the recovery rate for corrugated was 54 percent, but thanks to better infrastructure, recycling programs and awareness efforts, that rate has steadily climbed to 93 percent for 2016.⁵ The corrugated recycling symbol—a box with a recognizable chasing arrow around it—was introduced in 1993. Use and awareness of the symbol, along with efforts by corrugated manufacturers, recyclers, local governments and others to create a healthy recycling infrastructure, have helped improve this recovery rate. The rate is especially high for corrugated materials being collected from commercial facilities such as stores and factories.

“A tremendous amount of corrugated is recovered—people have been getting the message, but because of buying behaviors shifting to more goods going directly to consumers’ homes, we want to make sure the recovery rate continues to improve,” states FBA’s Kenyon. “We want to work with industry and consumers to ensure that when people do receive deliveries at home, they take that extra step to recycle.”

⁵ Corrugated.org website, Recycling Corrugated Packaging page. <http://www.corrugated.org/recycling/>



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Corrugated's high recycling rate has led to a reduction in greenhouse gas emissions by 35 percent between 2006-2014 due to less methane emissions.⁶

There's long-held industry belief that the fibers in corrugated boxes can be recycled about seven or eight times before they begin to lose their performance characteristics. While research indicates that fibers could be used up to 30

or more times, it's a given that the industry will always need some of its material to come from harvesting trees. Under sustainable forestry practices, new trees are planted to offset those being harvested. Currently, the average corrugated box contains 48 percent recycled content.

Corrugated manufacturers also have improved their sustainability performance at the mill and manufacturing levels. Mills are now using cleaner fuels like natural gas, with a 27 percent increase in the industry's use of natural gas since 2006.⁵ The energy management and process control systems in mills are more efficient than in the past, as is their use of water. Corrugated's high recycling rate has led to a reduction in greenhouse gas emissions by 35 percent between 2006-2014 due to less methane emissions.⁶

"Corrugated holds a sustainability advantage as a material for packaging and shipping, in part because of the recycling efforts that have been made, but quite simply, because it's a renewable resource," states Kenyon. "Corrugated is made from natural, plant-based fibers that can be reliably recycled. When you combine that quality with its advantages in strength, in product protection, and versatility in right-sizing boxes and customizing them to improve the customer experience, it is clear why corrugated is the perfect package for e-commerce. People in industry have used corrugated for a long time—now it's time to fully appreciate how it can help meet current and future fulfillment objectives." ■

About Fibre Box

The Fibre Box Association (FBA) is a non-profit trade association that represents North American corrugated packaging manufacturers and strives to grow, protect and enhance the overall well-being of the industry by providing member-valued programs and services.

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⁶ Corrugated.org website, Corrugated Packaging Recycles page. <http://www.corrugated.org/recycles/>